View Full Version : Troubleshooting Black Powder Production

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AIB April 25th, 2007, 10:01 PM

Hello folks, I hope you can help my solve this problem.

I have been attempting to produce black powder - I got my ball mill, my scale, my sulfur, my KNO3, my lead media, everything nessecary to do the job. I put together a 75/15/10 BP mix and milled it for an hour and a half. I then filled a PVC length of pipe about 90% full, capped on both ends, drilled a hole on one side, ran some fuse in, taped the fuse, and lit it.

Now, unfortionately, it did not have the desired effect. I was hoping for a simple retort, like in my tests with commercial black powder. What happened was that when the BP ignited, it produced an initial loud noise, but then the pipe was simply consumed in flame - meaing that the BP failed to detonate.

I am hoping someone can help me diagnose what exactly went wrong here. I came to a few ideas myself, maybe someone can confirm or rule out these:

1) Maybe I left too much empty space inside the pipe?
2) Maybe I left too little empty space inside the pipe?
3) Maybe my charcoal was poor. I was careful to select a "Natural" charcoal(no additives, as I am aware such charcoal produces poor BP).
4) Maybe I simply did not mill the BP long enough (1 hour 30 minutes approx.)

Do any of these seem likely? Can anyone point me in the right direction as far as figuring this out? Comments? Suggestions?

Thank you very much in advance,
- AIB

nbk2000 April 26th, 2007, 12:28 AM

pipe about 90% full, capped on both ends, drilled a hole on one side,

And it's at this point that the Angel that looks out for fools and little children earns his pay. :rolleyes:

You NEVER drill into a device that has a reactive filling of any kind!

Now, to your questions;

1. Moot point as the device did ignite.

2. Not possible without a hydraulic press.

3. Possible, as some charcoals are inferior, despite being 'natural'.

4. Quite likely the cause.

It's usually considered good to mill each ingredient seperately, then to mill together with a percent or two of water, then dry.

Also, the material really needs to be consolidated under high-pressure and granulated for it to burn efficiently, otherwise it's not really gunpowder, more like lift-powder.

CCC April 26th, 2007, 05:22 AM

I read many articles said that BP mixture are milled with water, I think this is safety purposes but I want to know how to dry them, Naturally or with any devices??? KNO3 will crystallined again when mix with water and dry??

April 26th, 2007, 05:27 AM

Even with an efficient ball mill of the Sponenburgh type milling will last at least 3 hours or longer to make good quality BP. If your ball mill is a rock tumbler milling time increases to more than 10 hours to get anywhere near good quality fast burning BP.

Polverone is the way to go without the need for milling.T

Pressing and granulating is imperative for use in salutes, guns etc.

@CCC

I strongly advice against wet milling BP, it's a real mess. BP can be milled with non-sparking milling media without any problems.

To prevent KNO3 from cristallizing out large quantities of aceton or ethanol is added to the BP slurry. This is of course expensive and dangerous because of the flammable fumes.

To speed up drying of BP and other mixtures a deep pan of dry sand covered with tin foil could be preheated in an oven to about 80� C taken out of the oven when thoroughly heated through and the composition spread thinly on the tin foil. The sand in the pan acts as a safe heat source which will release the heat over some time without the danger of getting hotter than the initial temperature.

ChippedHammer April 26th, 2007, 06:09 AM

Its hard to use BP and make a good salute, it will tend to blow the ends off or force its way through the fuse hole. Its possible but you need to make the tube so that the weakest point is the walls.

Crap starting materials will net crap product

hst45 April 26th, 2007, 02:28 PM

1) Mill it longer; try 6 or 8 hours minimum, up to 16 if your mill and media are particularly inefficient.

2) Take the milled meal, wet it with 70/30 water/ethanol, and press it through a screen. A simple window screen will do. Dry these grains for a day or two, and attempt the same project. Your results should improve dramatically

AIB April 26th, 2007, 02:44 PM

Thanks for the advice folks. Seems to me like I just didn't mill it long enough.

Oh I did not drill the cap with BP inside - I am all too aware of the dangers involving BP and friction. Thanks for pointing that out though.

Some small follow up questions:
1) What does the addition of water do exactly?
2) Can I add water without getting involved with ethanol and such?
3) Will pressing it through a screen granulate the BP?

Thanks!

defiant April 26th, 2007, 06:27 PM

As NBK noted, not all charcoals are equivalent. Check out the different charcoals at http://skylighter.com/mall/chemicals.asp?Sort=C (i.e. "air float" charcoal).

nbk2000 April 26th, 2007, 08:27 PM

Tomu, the water is added in such a small amount that the BP isn't even really damp, let alone mushy.

The water just helps everything mix better and is well established procedure in commercial BP factories.

Bacon46 April 26th, 2007, 08:53 PM

I agree with NBK.

Could be the charcoal but you probably didn't mill it long enough.

I use Diablo brand natural Mesquite charcoal. It is readily available in groceries stores the southwestern US for around $1.00 per pound and it performs very well. I crush the large pieces by placing them in a bucket and hitting them with the end of a steel pipe. Once the charcoal is in manageable pieces I ball mill into Airfloat.

When making Black Powder I ball mill the composition dry for 10 to 12 hours, moisten it with shellac and push it through a wire mesh pencil holder I picked up at the local office supply store. It's courser than window screen and I prefer a course grain Black Powder.

All I use Black Powder for is a propellant. When I want to make noise I use a 2:1 KClO4 / Al flash powder. Drilling a hole in a pipe loaded with BP is stupid enough, don't even be doing that with a pipe loaded with flash composition or we will be reading about you in the papers.

AIB April 26th, 2007, 09:17 PM

nbk2000:
Thanks for the info. I will add water to my BP - But at what point should I add the water, and how much?

defiant:
Having trouble viewing that link. On a related note, what is air float and activated charcoal?

Bacon46:
Thanks for your concern. But I already clarified in my previous post that I was not drilling the pipe with BP inside.

Diablo brand natural mesquite charcoal, hmmm? I will check it out man, thanks for the advice.

defiant April 26th, 2007, 09:57 PM

Google it. You've got the key phrases.

CCC April 26th, 2007, 10:17 PM

Tomu, many thanks for your experience.:)

ucorky April 26th, 2007, 11:06 PM

I had a similar issue in trying to make useful lifting powder. My issue was not enough KN03 but man I milled the living hell out of the whole batch before these guys put me right on my mixture. I used a modified rock tumbler unit for milling.

tomu April 27th, 2007, 04:33 AM

@AIB
First reduce your large charcoal chunks fromthe bag to small chips, mill this chips to airfloat charcoal dust. Mill all other ingridients if necessary (coarse KNO3, sulphur chips etc.).

Weigh the necessary quantum of all ingridients e.g. 75/15/10. Mix weight ingridients dry in a suitable container, now you've got what is termed green meal. Now is the time to add between 1% - 2% water with a sprayer/mister and mix it in. After this step you mill the stuff.

My exprience with milling such a damp green meal is that it cakes up badly in my ball mill (20 cm Sponenburgh-type mill). Even milling KNO3 without prior drying just gives a hard cake (I always dry it prior to milling and add some charcoal powder 1%-3% to prevent cakeing).

My way of making green meal is wet mixing it like in Polverone/CIA production. The KNO3 is dissolved in boiling hot water this is added slowly to the premixed charcoal/sulphur and this stuff is than dried (I don't add any ethanol or aceton, I just dry on the sand drying bath) and after thoroughly dry, milled for about 3 - 4 hours.

If you want to granule your BP by screening it through a window screen/sieve, you should add up o 5% of dextrin to the BP. Do not add the dextrin to a wet BP only to dry BP. If you added to a wet or damp BP it will build up clumps and don't blend with the BP meal powder. Blend the dextrin well with the dry BP meal and than add enough water to make the whole stuff damp not dripping wet. Stirr well and let it soak for a few minutes. Than need the BP mix to a ball and rub it through the screen/sieve. Collect the granules and let them dry. Ready to go.

Btw. if you don't have dextrin wall papaer paste (methlycellulose) works quiet as well, you just add a little bit less of it to the green meal.

Everyone has his own way of making BP so there are several ways to go about it. Mine is certainly not the ultima ratio, but it works for me.

Have fun!

nbk2000 April 27th, 2007, 05:56 AM

Take a small sample, weigh it if possible, and measure the amount of distilled water you can add to it before it becomes moist. Then use less than that for your larger batch. Use a spray bottle to mist the water evenly so you don't get any soaked spots that'd crystallize.

Bert April 27th, 2007, 07:30 AM

The use of a small quantity of water in the milling stage was a common technique in commercial BP manufacture, and references to this are wide and near universal in historical accounts of powder milling- However, the mills being used in these descriptions were EDGE RUNNER mills, not BALL mills. For a ball mill, I have found that it is unnecessary and generally a pain in the ass. A small amount of water or (better) water/alcohol mix need only be used to help consolidate the milled mix into "cakes" for granulation.

Making BP is a lot like cooking. You can read about it to learn the theories about how and why different processes works all day long, but you will still have to get into the kitchen to see what results are obtainable with your equipment and materials. Even the 75:15:10 ratio is not set in stone, depending on incorporation process and consolidation pressures, other ratios CAN give better performance.

Pb_Producer April 27th, 2007, 12:50 PM

It could be the sulfur your using, I�ve been using garden sulfur which is a crapy green coulor and I've been having the same problems, recently I decided to refine it and the black powder worked a lot better. You can refine it by double boiling it and scooping off the crap on the top (beware of the sulfur dioxide its toxic). Unless you sulfur is a lemon yellow id try refining it.

Hardwood charcoal is also better, like oak, maple, apple, cedar, don�t use store bought briquettes.

The better your ingredients are the better your powder will be, the little things make a big difference in black powder.

AlB April 27th, 2007, 06:01 PM

I want to thank everyone who replied to this thread.

I guess there are really a lot of factors involved with Black Powder production - now I just wish I had more free time and money, to experiment and such, hehe.

Oh and by the way I have a Chicago Electric 6LB Dual Drum Rock Grinder that I use. I could not find an affordable alternative. Something that also occured to me is that perhaps I did not mill my charcoal sufficiently long, something that I think someone else pointed out. My KNO3 and Sulfur are both powdery, but the KNO3 could maybe be milled a little finer. The problem is cleaning out those damn drums each time. And how do you clean lead antimony media?

Thanks again for the comments and advice!

Frunk April 28th, 2007, 01:38 AM

The problem is cleaning out those damn drums each time.

I agree. By all means, if you get a tumbler with those rubber barrels, replace them with 4" pvc pipe. The rubber is ridiculously hard to clean, it is full of pores.

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